What Is Claimed Is:

1. Apparatus for identification of materials in a pulp or paper sample comprising

a scannable surface for receiving the pulp or paper sample;

a Raman spectroscope including a spectroscopic probe positioned to scan the sample on said scannable surface, said spectroscope adapted to output images;

translating means for causing relative translation between said scannable surface and said Raman spectroscope probe;

control means for causing said translating means to move said scannable surface and the sample thereon relative to said probe along said axes in a selected pattern, and

means for analyzing the output of the spectroscope, for comparing the output images of said spectroscope to at least one known material image, and for identifying and communicating data on at least one output image from the sample.

2. Apparatus as set forth in Claim 1, wherein said at least one known material image comprises at least one image of paper fibers.

3. Apparatus as set forth in Claim 1, wherein said at least one known material image comprises images of at least one of the group consisting of stickies, sclereids and shives.

4. Apparatus as set forth in Claim 1 further comprising a library of images of known materials, and wherein said means for analyzing compares said output images of said spectroscope to said library of material images for identifying and communicating data on said output images.

5. Apparatus as set forth in Claim 4, wherein said library of known material images includes an image of a known paper and a plurality of images of known contaminants, wherein said translating means and said control means cause said scannable surface to move relative to said probe substantially continuously in the selected pattern and said analyzing means identifies cells of non-paper material images, and wherein said translating means and said control means cause said scannable surface to move relative to said probe in said non-paper fiber cells and said analyzing means compares the spectroscope output images to said library of known images for identifying and communicating data on contaminants in the sample.

6. Apparatus as set forth in Claim 1 wherein said analyzing means further communicates the presence of unknown images.

7. Apparatus as set forth in Claim 1 wherein said translating means, said spectroscope and said control means operate at speeds sufficient to produce a Raman spectroscopic analysis of the sample within a time frame of about thirty minutes or less based on a sample surface size at least about 64 square inches.

8. Apparatus as set forth in Claim 1 wherein said translating means and said control means cause said scannable surface to repetitively move relative to said probe a first selected distance along the X-axis in one direction and, to move a second selected distance along the Y-axis, and to move in the opposite direction said first selected distance along the X-axis.

9. Apparatus as set forth in Claim 1 wherein said translating means and said control means cause said scannable surface to move relative to said probe substantially continuously in the selected pattern and the spectroscope is caused to produce a substantially continuous scan of the sample.

10. Apparatus as set forth in Claim 1 wherein said translating means and said control means cause said scannable surface to move relative to said probe intermittently in the selected pattern and the spectroscope is triggered to produce a sample scan at each pause in the intermittent movement.

11. Apparatus as set forth in Claim 1 wherein said spectroscopic probe includes means for determining characteristics of the sample along the Z-axis of the sample.

12. Apparatus as set forth in Claim 1, wherein said at least one known material image comprises at least one contaminant image, and said analyzing means identifies and quantifies said at least one contaminant in the sample.

13. Apparatus for identification of materials in a pulp or paper sample comprising,

a scannable surface for receiving the pulp or paper sample;

a Raman spectroscope including a spectroscopic probe positioned to scan the sample on said scannable surface, said spectroscope adapted to output images;

a translator for causing relative translation between said scannable surface and said Raman spectroscope probe in a selected pattern, and

a computer for storing images of known materials, for comparing the output images of said spectroscope to at least one of said known material images, and for identifying and communicating data on at least one output image from the sample.

14. A method for identifying materials in a pulp or paper sample comprising the steps of

translating the sample along plural axes in a selected pattern,

scanning the sample with a Raman spectroscope as it is translated along said pattern,

comparing Raman spectroscopic images generated by the probe with a library of Raman spectroscopic images of known materials potentially present in the sample, and

identifying and communicating data on at least one of the materials discerned in the sample.

15. A method as set forth in Claim 14 wherein the steps recited in Claim 14 are carried out at speeds sufficient to produce a Raman spectroscopic analysis of the sample within a time frame of about thirty minutes or less based on a sample surface size of at least 64 square inches.

16. A method as set forth in Claim 14 wherein the translating and scanning steps are substantially continuous, and said identifying step comprises identifying cells of foreign substances from the desired constituents of the pulp or paper.

17. A method as set forth in Claim 16 further comprising the steps of translating and scanning the identified cells of foreign substances in the sample, and identifying and communicating data on at least one of the foreign substances discerned in the sample.

18. A method as set forth in Claim 17, further comprising the step of generating a map of the foreign substances discerned in the sample.

19. A method as set forth in Claim 14 further comprising the steps of providing a wet sample and spectroscopically analyzing characteristics of the sample along the Z-axis of the sample.

20. A method as set forth in Claim 14 wherein said library of Raman spectroscopic images of known materials comprises contaminant images, and wherein said step of identifying and communicating data includes determining the size of at least one contaminant material discerned in the sample.

21. A method as set forth in Claim 14 further comprising the step of providing the pulp or paper sample on-line in a pulp or papermaking process.

22. A method of identifying materials in a pulp or paper sample with a Raman spectrometer comprising the steps of:

identifying a plurality of materials that may appear in pulp or paper,

making a Raman image of all or selected ones of the materials,

inputting each of the material images into a library,

scanning the sample of pulp or paper with a Raman spectroscope,

comparing images generated by scanning the sample with the material images in the library, and

identifying and communicating data on the images discerned in the sample by the probe and matched with a material image in the library.

23. A method of determining the characteristics of a pulp or paper sample comprising the steps of

identifying constituents in pulp or paper,

making a Raman image of the constituents and inputting each image into a library,

scanning the sample of pulp or paper with a Raman spectroscope,

comparing Raman spectroscopic images generated by the spectroscope with the constituent images in the library, and

identifying and communicating data on constituents discerned in the sample and matched with images in the library.

24. A method as set forth in Claim 21 including the steps of

spectroscopically analyzing the paper sample along the Z-axis using Raman spectroscopic technology,

generating Raman spectroscopic images of constituents present in the sample at various levels in the thickness dimension of the sample,

comparing the generated images of the constituents at each of the levels with the constituent images in the library, and

identifying and communicating data on the constituents discerned in the sample and matched with Raman images in the library at each of the levels, thereby to communicate a three-dimensional profile of the sample.

25. A computer program product for causing a spectrometer apparatus to detect impurities in a pulp or paper sample, the program product comprising computer readable instructions embedded in a computer readable medium that when executed by a computer cause the spectrometer apparatus to:

scan at least one background sample with the spectrometer, store a resultant background data member in a library;

scan at least one contaminant sample with the spectrometer, store a resultant contaminant data member in said library;

divide the sample into a plurality of cells, convey the sample while scanning said plurality of sample cells with the spectrometer, compare scan data from said sample scan of each of said plurality of cells with said background data member, flag

each cell having a scan differing from said background data member; and

re-scan each of said flagged cells and compare resultant scan data with said contaminant data members.

26. A computer program product as set forth in Claim 25, further comprising the step of converting raw scan data to normalized vector data.

27. A computer program product as set forth in Claim 25, wherein said program instructions when executed cause the spectrometer apparatus to convey the sample along an X and Y-axis orientation, and wherein said program instructions when executed further cause the spectrometer apparatus to output data comprising a relative location of contaminants with reference to said X and Y-axis orientation.